

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
13 October 2005 (13.10.2005)

PCT

(10) International Publication Number  
**WO 2005/096392 A3**

(51) International Patent Classification:  
**H01G 9/20** (2006.01)      **H01M 14/00** (2006.01)

(21) International Application Number:  
**PCT/JP2005/006716**

(22) International Filing Date: 30 March 2005 (30.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2004-105439                    31 March 2004 (31.03.2004) JP  
2004-121735                    16 April 2004 (16.04.2004) JP  
2005-002587                    7 January 2005 (07.01.2005) JP  
2005-005332                    12 January 2005 (12.01.2005) JP

(71) Applicant (for all designated States except US): THE YOKOHAMA RUBBER CO., LTD. [JP/JP]; 36-11, Shimbashi 5-chome, Minato-ku, Tokyo, 1058685 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): MARUYAMA, Tsukasa [JP/JP]; c/o THE YOKOHAMA RUBBER CO., LTD., HIRATSUKA FACTORY, 2-1, Oiwake, Hiratsuka-shi, Kanagawa, 2548601 (JP). SEKINE, Yuko [JP/JP]; c/o THE YOKOHAMA RUBBER CO., LTD.,

HIRATSUKA FACTORY, 2-1, Oiwake, Hiratsuka-shi, Kanagawa, 2548601 (JP).

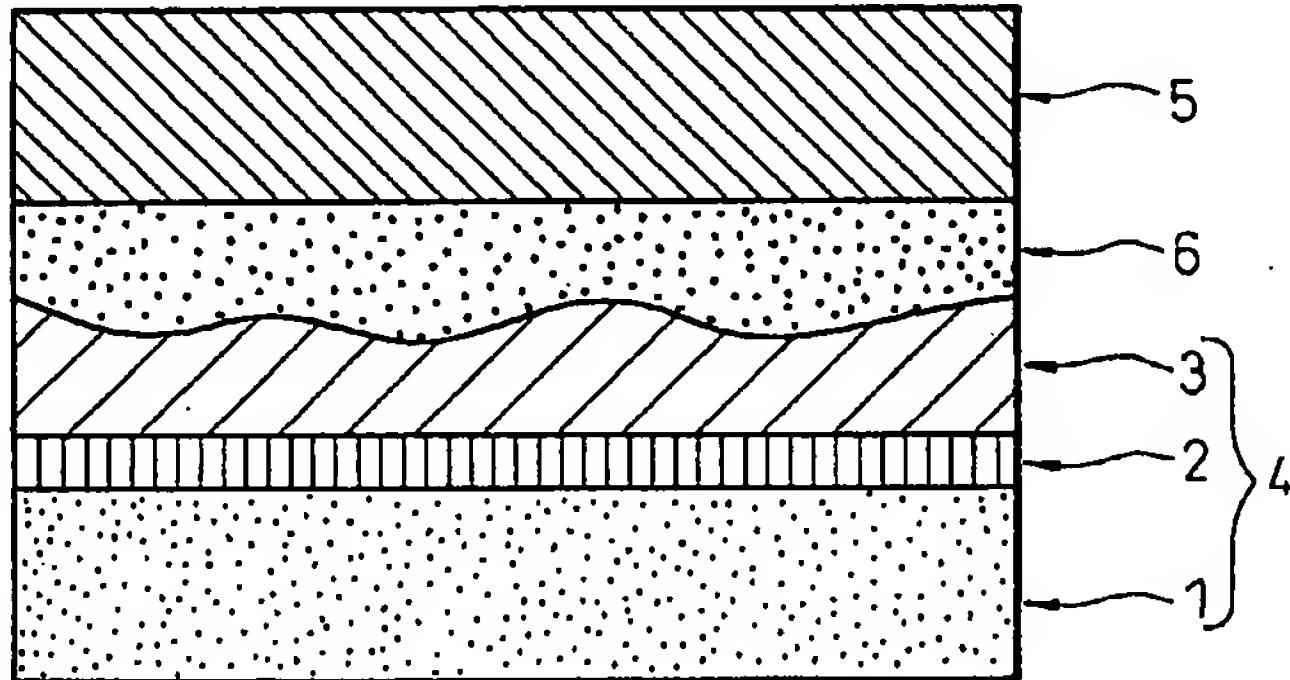
(74) Agents: AOKI, Atsushi et al.; A. AOKI, ISHIDA & ASSOCIATES, Toranomon 37 Mori Bldg., 5-1, Toranomon 3-chome, Minato-ku, Tokyo 1058423 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: ELECTROLYTE FOR PHOTOVOLTAIC DEVICE AS WELL AS PHOTOVOLTAIC DEVICE AND DYE-SENSITIZED SOLAR CELL INCLUDING THAT ELECTROLYTE



(57) Abstract: An electrolyte for a photovoltaic device including (i) a layered clay mineral and/or an organically modified layered clay mineral and (ii) an ionic liquid as well as a photovoltaic device including a photoelectrode including a transparent conducting layer and a metal oxide semiconductor mesoporous film using, as an electrolyte layer, the same, a counter electrode facing this photoelectrode and an electrolyte layer arranged between the photoelectrode and the counter electrode as well as a dye-sensitized solar cell composed of a photovoltaic device and a photosensitizer carried on a metal oxide semiconductor mesoporous film of the photovoltaic device, wherein the conductive substrate is obtained by coating, on a conductive substrate, a conductive polyaniline dispersion stably dispersed in an organic solvent including (A) a polyaniline obtained by polymerization of aniline or an aniline derivative, (B) a sulfonic acid compound and/or (C) an organic polymer having a protonic acid group, (D) a molecular weight modifier, and (E) an organic solvent capable of dissolving the sulfonic acid compound (B), the organic polymer having a protonic acid group (C), and the molecular weight modifier (D).

WO 2005/096392 A3

**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**(88) Date of publication of the international search report:**

13 April 2006